

## **IN THE CLAIMS:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) A display device comprising:

~~a plurality of pixels disposed in matrix over a substrate;~~

an active matrix circuit comprising a plurality of ~~pixel TFTs~~ pixels over ~~said a~~ substrate; ~~and, each of said pixels comprising at least first and second thin film transistors and a pixel electrode wherein a gate electrode of the first thin film transistor is electrically connected to a gate line and a gate electrode of the second thin film transistor is electrically connected to a drain region of the first thin film transistor, and the pixel electrode is electrically connected to one of source and drain regions of the second thin film transistor; and~~

a source driver and a gate driver which drive said active matrix circuit,

wherein n bit information out of m bit digital video data inputted from an external is used for a voltage gray scale method, and (m-n) bit information is used for a time ratio gray scale method, where said m and said n are integers equal to or larger than 2 and satisfy  $m > n$ , and

wherein each step of a voltage level for said voltage gray scale method is designated as  $(V_H - V_L)/2^n$ , where  $V_H$  is the highest voltage level of voltages inputted to a D/A converter circuit, and  $V_L$  is the lowest voltage level of voltages inputted to said D/A converter circuit.

2. (Currently Amended) A display device comprising:

a plurality of pixels disposed in matrix over a substrate;

an active matrix circuit comprising a plurality of pixel TFTs over said substrate; and

a source driver and a gate driver which drive said active matrix circuit,

wherein n bit information out of m bit digital video data inputted from an external is

used for a voltage gray scale method, and (m-n) bit information is used for a time ratio gray scale method, where said m and said n are integers equal to or larger than 2 and satisfy  $m > n$ ,

wherein each step of a voltage level for said voltage gray scale method is designated as  $(V_H - V_L)/2^n$ , where  $V_H$  is the highest voltage level of voltages inputted to a D/A converter circuit, and  $V_L$  is the lowest voltage level of voltages inputted to said D/A converter circuit, and wherein ~~said~~ one frame period comprises  $2^{m-n}$  subframe periods.

3. (Currently Amended) A display device comprising:

~~a plurality of pixels disposed in matrix over a substrate;~~

an active matrix circuit comprising a plurality of ~~pixel TFTs~~ pixels over ~~said a~~ substrate; each of said pixels comprising at least first and second thin film transistors and a pixel electrode wherein a gate electrode of the first thin film transistor is electrically connected to a gate line and a gate electrode of the second thin film transistor is electrically connected to a drain region of the first thin film transistor, and the pixel electrode is electrically connected to one of source and drain regions of the second thin film transistor;

a source driver and a gate driver which drive said active matrix circuit over said substrate; and

a circuit which converts m bit digital video data inputted from an external into n bit digital video data and provides said n bit digital video data to said source driver, where said m and said n are integers equal to or larger than 2 and satisfy  $m > n$ , wherein said circuit is formed over said substrate,

wherein each step of a voltage level for said voltage gray scale method is designated as  $(V_H - V_L)/2^n$ , where  $V_H$  is the highest voltage level of voltages inputted to a D/A converter circuit, and  $V_L$  is the lowest voltage level of voltages inputted to said D/A converter circuit; ~~and~~

~~wherein one frame image comprises  $2^{m-n}$  subframes.~~

4. (Currently Amended) A display device comprising:

a plurality of pixels disposed in matrix over a substrate;

an active matrix circuit comprising a plurality of pixel TFTs over said substrate;

a source driver and a gate driver which drive said active matrix circuit over said substrate; and

a circuit which converts m bit digital video data inputted from an external into n bit digital video data and provides said n bit digital video data to said source driver, where said m and said n are integers equal to or larger than 2 and satisfy  $m > n$ , wherein said circuit is formed over said substrate,

wherein each step of a voltage level for said voltage gray scale method is designated as  $(VH-VL)/2^n$ , where VH is the highest voltage level of voltages inputted to a D/A converter circuit, and VL is the lowest voltage level of voltages inputted to said D/A converter circuit, and

wherein one frame ~~image period~~ comprises  $2^{m-n}$  ~~subframes~~ subframe periods.

5. (Currently Amended) A display device comprising:

~~a plurality of pixels disposed in matrix over a substrate;~~

an active matrix circuit comprising a plurality of ~~pixel TFTs~~ pixels over said a substrate; and, each of said pixels comprising at least first and second thin film transistors and a pixel electrode wherein a gate electrode of the first thin film transistor is electrically connected to a gate line and a gate electrode of the second thin film transistor is electrically connected to a drain region of the first thin film transistor, and the pixel electrode is electrically connected to one of source and drain regions of the second thin film transistor; and

a source driver and a gate driver which drive said active matrix circuit,

wherein n bit information out of m bit digital video data inputted from an external is

used for a voltage gray scale method and  $(m-n)$  bit information is used for a time ratio gray scale method, where said  $m$  and said  $n$  are integers equal to or larger than 2 and satisfy  $m > n$ ,

wherein each step of a voltage level for said voltage gray scale method is designated as  $(V_H - V_L)/2^n$ , where  $V_H$  is the highest voltage level of voltages inputted to a D/A converter circuit, and  $V_L$  is the lowest voltage level of voltages inputted to said D/A converter circuit, and

wherein an image is displayed by an image gray scale of  $(2^m - (2^{m-n} - 1))$  patterns.

6. (Currently Amended) A display device comprising:

a plurality of pixels disposed in matrix over a substrate;

an active matrix circuit comprising a plurality of pixel TFTs over said substrate; and

a source driver and a gate driver which drive said active matrix circuit,

wherein  $n$  bit information out of  $m$  bit digital video data inputted from an external is used for a voltage gray scale method and  $(m-n)$  bit information is used for a time ratio gray scale method, where said  $m$  and said  $n$  are integers equal to or larger than 2 and satisfy  $m > n$ ,

wherein each step of a voltage level for said voltage gray scale method is designated as  $(V_H - V_L)/2^n$ , where  $V_H$  is the highest voltage level of voltages inputted to a D/A converter circuit, and  $V_L$  is the lowest voltage level of voltages inputted to said D/A converter circuit, and

wherein ~~said~~ one frame period comprises  $2^{m-n}$  subframe periods, and

wherein an image is displayed by an image gray scale of  $(2^m - (2^{m-n} - 1))$  patterns.

7. (Currently Amended) A display device comprising:

~~a plurality of pixels disposed in matrix over a substrate;~~

an active matrix circuit comprising a plurality of ~~pixel TFTs~~ pixels over ~~said a~~ substrate; each of said pixels comprising at least first and second thin film transistors and a pixel electrode wherein a gate electrode of the first thin film transistor is electrically connected to a

gate line and a gate electrode of the second thin film transistor is electrically connected to a drain region of the first thin film transistor, and the pixel electrode is electrically connected to one of source and drain regions of the second thin film transistor;

a source driver and a gate driver which drive said active matrix circuit over said substrate; and

a circuit which converts m bit digital video data inputted from an external into n bit digital video data and provides said n bit digital video data to said source driver, wherein said m and said n are integers equal to or larger than 2 and satisfy  $m > n$ , wherein said circuit is formed over said substrate,

wherein each step of a voltage level for said voltage gray scale method is designated as  $(V_H - V_L)/2^n$ , where  $V_H$  is the highest voltage level of voltages inputted to a D/A converter circuit, and  $V_L$  is the lowest voltage level of voltages inputted to said D/A converter circuit, and

wherein an image is displayed by an image gray scale of  $(2^m - (2^{m-n} - 1))$  patterns.

8. (Currently Amended) A display device comprising:

a plurality of pixels disposed in matrix over a substrate;

an active matrix circuit comprising a plurality of pixel TFTs over said substrate;

a source driver and a gate driver which drive said active matrix circuit over said substrate; and

a circuit which converts m bit digital video data inputted from an external into n bit digital video data and provides said n bit digital video data to said source driver, wherein said m and said n are integers equal to or larger than 2 and satisfy  $m > n$ , wherein said circuit is formed over said substrate,

wherein each step of a voltage level for said voltage gray scale method is designated as  $(V_H - V_L)/2^n$ , where  $V_H$  is the highest voltage level of voltages inputted to a D/A converter

circuit, and VL is the lowest voltage level of voltages inputted to said D/A converter circuit, and  
wherein one frame ~~image~~ period comprises  $2^{m-n}$  ~~subframes~~ subframe periods, and  
wherein an image is displayed by an image gray scale of  $(2^m - (2^{m-n} - 1))$  patterns.

9.(Previously Presented) A display device according to claim 1 wherein said display device comprises thresholdless antiferroelectric mixed liquid crystal indicating electro-optical characteristic of V-shape.

10.(Previously Presented) A display device according to claim 1 wherein said m is 8 and said n is 2.

11.(Previously Presented) A display device according to claim 1 wherein said m is 12 and said n is 4.

12.(Previously Presented) A rear projector comprising three of the display devices according to claim 1.

13.(Previously Presented) A front projector comprising three of the display devices according to claim 1.

14.(Previously Presented) A single plate type rear projector comprising a display device according to claim 1.

15.(Previously Presented) A goggle type display comprising two of the display device according to claim 1.

16.(Previously Presented) A portable information terminal comprising a display device according to claim 1.

17.(Previously Presented) A notebook type personal computer comprising a display device according to claim 1.

18.(Previously Presented) An EL display comprising a display device according to claim 1.

19.(Previously Presented) A display device according to claim 2 wherein said display device comprises thresholdless antiferroelectric mixed liquid crystal indicating electro-optical characteristic of V-shape.

20.(Previously Presented) A display device according to claim 3 wherein said display device comprises thresholdless antiferroelectric mixed liquid crystal indicating electro-optical characteristic of V-shape.

21.(Previously Presented) A display device according to claim 4 wherein said display device comprises thresholdless antiferroelectric mixed liquid crystal indicating electro-optical characteristic of V-shape.

22.(Previously Presented) A display device according to claim 5 wherein said display device comprises thresholdless antiferroelectric mixed liquid crystal indicating electro-optical characteristic of V-shape.

23.(Previously Presented) A display device according to claim 6 wherein said display device comprises thresholdless antiferroelectric mixed liquid crystal indicating electro-optical characteristic of V-shape.

24.(Previously Presented) A display device according to claim 7 wherein said display device comprises thresholdless antiferroelectric mixed liquid crystal indicating electro-optical characteristic of V-shape.

25.(Previously Presented) A display device according to claim 8 wherein said display device comprises thresholdless antiferroelectric mixed liquid crystal indicating electro-optical characteristic of V-shape.

26.(Previously Presented) A display device according to claim 2 wherein said m is 8 and said n is 2.

27.(Previously Presented) A display device according to claim 3 wherein said m is 8 and said n is 2.

28.(Previously Presented) A display device according to claim 4 wherein said m is 8 and said n is 2.

29.(Previously Presented) A display device according to claim 5 wherein said m is 8 and said n is 2.



30.(Previously Presented) A display device according to claim 6 wherein said m is 8 and said n is 2.

31.(Previously Presented) A display device according to claim 7 wherein said m is 8 and said n is 2.

32.(Previously Presented) A display device according to claim 8 wherein said m is 8 and said n is 2.

33.(Previously Presented) A display device according to claim 2 wherein said m is 12 and said n is 4.

34.(Previously Presented) A display device according to claim 3 wherein said m is 12 and said n is 4.

35.(Previously Presented) A display device according to claim 4 wherein said m is 12 and said n is 4.

36.(Previously Presented) A display device according to claim 5 wherein said m is 12 and said n is 4.

37.(Previously Presented) A display device according to claim 6 wherein said m is 12 and said n is 4.

38.(Previously Presented) A display device according to claim 7 wherein said m is 12 and

said n is 4.

39.(Previously Presented) A display device according to claim 8 wherein said m is 12 and said n is 4.

40.(Previously Presented) A rear projector comprising three of the display devices according to claim 2.

41.(Previously Presented) A rear projector comprising three of the display devices according to claim 3.

42.(Previously Presented) A rear projector comprising three of the display devices according to claim 4.

43.(Previously Presented) A rear projector comprising three of the display devices according to claim 5.

44.(Previously Presented) A rear projector comprising three of the display devices according to claim 6.

45.(Previously Presented) A rear projector comprising three of the display devices according to claim 7.

46.(Previously Presented) A rear projector comprising three of the display devices according to claim 8.

47.(Previously Presented) A front projector comprising three of the display devices according to claim 2.

48.(Previously Presented) A front projector comprising three of the display devices according to claim 3.

49.(Previously Presented) A front projector comprising three of the display devices according to claim 4.

50.(Previously Presented) A front projector comprising three of the display devices according to claim 5.

51.(Previously Presented) A front projector comprising three of the display devices according to claim 6.

52.(Previously Presented) A front projector comprising three of the display devices according to claim 7.

53.(Previously Presented) A front projector comprising three of the display devices according to claim 8.

54.(Previously Presented) A single plate type rear projector comprising a display device according to claim 2.

55.(Previously Presented) A single plate type rear projector comprising a display device according to claim 3.

56.(Previously Presented) A single plate type rear projector comprising a display device according to claim 4.

57.(Previously Presented) A single plate type rear projector comprising a display device according to claim 5.

58.(Previously Presented) A single plate type rear projector comprising a display device according to claim 6.

59.(Previously Presented) A single plate type rear projector comprising a display device according to claim 7.

60.(Previously Presented) A single plate type rear projector comprising a display device according to claim 8.

61.(Previously Presented) A goggle type display comprising two of the display device according to claim 2.

62.(Previously Presented) A goggle type display comprising two of the display device according to claim 3.

63.(Previously Presented) A goggle type display comprising two of the display device

according to claim 4.

64.(Previously Presented) A goggle type display comprising two of the display device according to claim 5.

65.(Previously Presented) A goggle type display comprising two of the display device according to claim 6.

66.(Previously Presented) A goggle type display comprising two of the display device according to claim 7.

67.(Previously Presented) A goggle type display comprising two of the display device according to claim 8.

68.(Previously Presented) A portable information terminal comprising a display device according to claim 2.

69.(Previously Presented) A portable information terminal comprising a display device according to claim 3.

70.(Previously Presented) A portable information terminal comprising a display device according to claim 4.

71.(Previously Presented) A portable information terminal comprising a display device according to claim 5.

72.(Previously Presented) A portable information terminal comprising a display device according to claim 6.

73.(Previously Presented) A portable information terminal comprising a display device according to claim 7.

74.(Previously Presented) A portable information terminal comprising a display device according to claim 8.

75.(Canceled)

76.(Previously Presented) A notebook type personal computer comprising a display device according to claim 2.

77.(Previously Presented) A notebook type personal computer comprising a display device according to claim 3.

78.(Previously Presented) A notebook type personal computer comprising a display device according to claim 4.

79.(Previously Presented) A notebook type personal computer comprising a display device according to claim 5.

80.(Previously Presented) A notebook type personal computer comprising a display

device according to claim 6.

81.(Previously Presented) A notebook type personal computer comprising a display device according to claim 7.

82.(Previously Presented) A notebook type personal computer comprising a display device according to claim 8.

83.(Previously Presented) An EL display comprising a display according to claim 2.

84.(Previously Presented) An EL display comprising a display device according to claim 3.

83.(Canceled)

85.(Previously Presented) An EL display comprising a display device according to claim 5.

86.(Previously Presented) An EL display comprising a display device according to claim 6.

87.(Previously Presented) An EL display comprising a display device according to claim 7.

88.(Previously Presented) An EL display comprising a display device according to claim

8.

89.(Previously Presented) A mobile telephone comprising a display device according to claim 1.

90.(Previously Presented) A mobile telephone comprising a display device according to claim 2.

91.(Previously Presented) A mobile telephone comprising a display device according to claim 3.

92.(Previously Presented) A mobile telephone comprising a display device according to claim 4.

93.(Previously Presented) A mobile telephone comprising a display device according to claim 5.

94.(Previously Presented) A mobile telephone comprising a display device according to claim 6.

95.(Previously Presented) A mobile telephone comprising a display device according to claim 7.

96.(Previously Presented) A mobile telephone comprising a display device according to claim 8.



97.(Previously Presented) A video camera comprising a display device according to claim

1.

98.(Previously Presented) A video camera comprising a display device according to claim

2.

99.(Previously Presented) A video camera comprising a display device according to claim

3.

100.(Previously Presented) A video camera comprising a display device according to  
claim 4.

101.(Previously Presented) A video camera comprising a display device according to  
claim 5.

102.(Previously Presented) A video camera comprising a display device according to  
claim 6.

103.(Previously Presented) A video camera comprising a display device according to  
claim 7.

104.(Previously Presented) A video camera comprising a display device according to  
claim 8.

105.(Previously Presented) A mobile computer comprising a display device according to claim 1.

106.(Previously Presented) A mobile computer comprising a display device according to claim 2.

107.(Previously Presented) A mobile computer comprising a display device according to claim 3.

108.(Previously Presented) A mobile computer comprising a display device according to claim 4.

109.(Previously Presented) A mobile computer comprising a display device according to claim 5.

110.(Previously Presented) A mobile computer comprising a display device according to claim 6.

111.(Previously Presented) A mobile computer comprising a display device according to claim 7.

112.(Previously Presented) A mobile computer comprising a display device according to claim 8.

113.(Previously Presented) A portable electronic book comprising a display device

according to claim 1.

114.(Previously Presented) A portable electronic book comprising a display device according to claim 2.

115.(Previously Presented) A portable electronic book comprising a display device according to claim 3.

116.(Previously Presented) A portable electronic book comprising a display device according to claim 4.

117.(Previously Presented) A portable electronic book comprising a display device according to claim 5.

118.(Previously Presented) A portable electronic book comprising a display device according to claim 6.

119.(Previously Presented) A portable electronic book comprising a display device according to claim 7.

120.(Previously Presented) A portable electronic book comprising a display device according to claim 8.

121.(Previously Presented) A personal computer comprising a display device according to claim 1.

122.(Previously Presented) A personal computer comprising a display device according to claim 2.

123.(Previously Presented) A personal computer comprising a display device according to claim 3.

124.(Previously Presented) A personal computer comprising a display device according to claim 4.

125.(Previously Presented) A personal computer comprising a display device according to claim 5.

126.(Previously Presented) A personal computer comprising a display device according to claim 6.

127.(Previously Presented) A personal computer comprising a display device according to claim 7.

128.(Previously Presented) A personal computer comprising a display device according to claim 8.

129.(Previously Presented) An electronic game equipment comprising a display device according to claim 1.

130.(Previously Presented) An electronic game equipment comprising a display device according to claim 2.

131.(Previously Presented) An electronic game equipment comprising a display device according to claim 3.

132.(Previously Presented) An electronic game equipment comprising a display device according to claim 4.

133.(Previously Presented) An electronic game equipment comprising a display device according to claim 5.

134.(Previously Presented) An electronic game equipment comprising a display device according to claim 6.

135.(Previously Presented) An electronic game equipment comprising a display device according to claim 7.

136.(Previously Presented) An electronic game equipment comprising a display device according to claim 8.

137.(Previously Presented) An image reproduction device comprising a display device according to claim 1.

138.(Previously Presented) An image reproduction device comprising a display device

according to claim 2.

139.(Previously Presented) An image reproduction device comprising a display device according to claim 3.

140.(Previously Presented) An image reproduction device comprising a display device according to claim 4.

141.(Previously Presented) An image reproduction device comprising a display device according to claim 5.

142.(Previously Presented) An image reproduction device comprising a display device according to claim 6.

143.(Previously Presented) An image reproduction device comprising a display device according to claim 7.

144.(Previously Presented) An image reproduction device comprising a display device according to claim 8.

145.(Previously Presented) A digital camera comprising a display device according to claim 1.

146.(Previously Presented) A digital camera comprising a display device according to claim 2.

147.(Previously Presented) A digital camera comprising a display device according to claim 3.

148.(Previously Presented) A digital camera comprising a display device according to claim 4.

149.(Previously Presented) A digital camera comprising a display device according to claim 5.

150.(Previously Presented) A digital camera comprising a display device according to claim 6.

151.(Previously Presented) A digital camera comprising a display device according to claim 7.

152.(Previously Presented) A digital camera comprising a display device according to claim 8.

153.(Previously Presented) An EL display comprising a display device according to claim 4.